

CLAIMS

WHAT IS CLAIMED IS:

- See 7
- 1 1. A method of generating a first tagged machine pointer to a first object referenced
 2 by a second object, said method comprising the computer-implemented steps of:
 3 fetching a tagged numeric reference stored within the second object based on a
 4 second tagged machine pointer that points to the second object; and
 5 generating the first tagged machine pointer as a sum including the tagged numeric
 6 value and the second tagged machine pointer.
 - 1 2. The method of claim 1, wherein the sum further includes a predetermined
 2 constant.
 - 1 3. The method of claim 1, wherein the step of fetching a tagged numeric reference
 2 includes fetching the tagged numeric reference that includes a tag portion that indicates
 3 whether the first object and the second object have a same or a different contiguity.
 - 1 4. The method of claim 3, wherein:
 2 the tag portion includes bits of the first tagged numeric reference that are less
 3 significant than bits used for an offset portion; and
 4 the tag portion contains one of at least a first tag value indicating that the first object
 5 is contiguous and a second value indicating that the second object is non-
 6 contiguous, wherein a difference of the first value and the second value is
 7 congruent to 2^{N-1} modulo 2^N .

1 8. A method of managing memory, comprising the computer-implemented steps of:
2 storing a plurality of objects in a memory; and
3 storing references between the objects in the memory as self-relative numeric
4 references.

1 9. The method of claim 8, further comprising the step of calculating a pointer
2 difference between a first machine pointer to a first object and a second machine pointer
3 to a second object to produce a self-relative numeric reference.

1 10. The method of claim 8, wherein the step of calculating a pointer difference
2 between a first machine pointer to a first object and a second machine pointer to a second
3 object to produce a self-relative numeric reference includes the step of calculating the
4 pointer difference between a first tagged machine pointer to the first object and a second
5 tagged machine pointer to the second object to produce a tagged self-relative numeric
6 reference.

1 11. The method of claim 10, wherein the pointer difference further includes a
2 predetermined constant.

1 12. The method of claim 10, wherein a tag portion of the self-relative numeric
2 reference indicates whether the first object and the second object have a same or different
3 contiguity.

1 13. The method of claim 12, wherein:
2 the tag portion includes bits of the tagged self-relative numeric reference that are less
3 significant than bits used for an offset portion; and

4 the tag portion contains one of at least a first tag value indicating that the first object
5 is contiguous and a second value indicating that the second object is non-
6 contiguous, wherein a difference of the first value and the second value is
7 congruent to 2^{N-1} modulo 2^N .

1 14. A computer-readable medium bearing instructions for generating a first tagged
2 machine pointer to a first object referenced by a second object, said instructions arranged,
3 when executed, to cause one or more processors to perform the steps of:
4 fetching a tagged numeric reference stored within the second object based on a
5 second tagged machine pointer that points to the second object; and
6 generating the first tagged machine pointer as a sum including the tagged numeric
7 value and the second tagged machine pointer.

1 15. The computer-readable medium of claim 14, wherein the sum further includes a
2 predetermined constant.

1 16. The computer-readable medium of claim 14, wherein the step of fetching a
2 tagged numeric reference includes fetching the tagged numeric reference that includes a
3 tag portion that indicates whether the first object and the second object have a same or a
4 different contiguity.

1 17. The computer-readable medium of claim 16, wherein:
2 the tag portion includes bits of the first tagged numeric reference that are less
3 significant than bits used for an offset portion; and
4 the tag portion contains one of at least a first tag value indicating that the first object
5 is contiguous and a second value indicating that the second object is non-

6 contiguous, wherein a difference of the first value and the second value is
7 congruent to 2^{N-14} modulo 2^N .

1 ~~21.~~ A computer-readable medium bearing instructions for managing memory, said
2 instructions arranged, when executed, to cause one or more processors to perform the
3 steps of:
4 storing a plurality of objects in a memory; and
5 storing references between the objects in the memory as self-relative numeric
6 references.

1 22. The computer-readable medium of claim 21, said instructions further arranged to
2 cause said one or more processors to perform the step of calculating a pointer difference
3 between a first machine pointer to a first object and a second machine pointer to a second
4 object to produce a self-relative numeric reference.

1 23. The computer-readable medium of claim 21, wherein the step of calculating a
2 pointer difference between a first machine pointer to a first object and a second machine
3 pointer to a second object to produce a self-relative numeric reference includes the step of
4 calculating the pointer difference between a first tagged machine pointer to the first
5 object and a second tagged machine pointer to the second object to produce a tagged self-
6 relative numeric reference.

1 24. The computer-readable medium of claim 23, wherein the pointer difference
2 further includes a predetermined constant.

1 25. The computer-readable medium of claim 23, wherein a tag portion of the self-
2 relative numeric reference indicates whether the first object and the second object have a
3 same or different contiguity.

1 26. The computer-readable medium of claim 25, wherein:
2 the tag portion includes bits of the tagged self-relative numeric reference that are less
3 significant than bits used for an offset portion; and
4 the tag portion contains one of at least a first tag value indicating that the first object
5 is contiguous and a second value indicating that the second object is non-
6 contiguous, wherein a difference of the first value and the second value is
7 congruent to 2^{N-14} modulo 2^N .

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B'

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